

I claim:

1. An efficient method of combining signals from a digital transmitter and an analog transmitter to produce a combined HD (High Definition) radio signal, comprising the
5 steps of:
 - providing a Linear Solid State IBOC transmitter with both digital and analog carriers output;
 - providing a separate analog transmitter with an analog output; and
 - combining the digital and analog carriers output of Linear Solid State IBOC
10 transmitter through a combiner with the analog output of the separate analog transmitter.
2. The method of claim 1, wherein the combiner includes the step of: providing a 3dB Hybrid combiner.
- 15 3. The method of claim 1, wherein the step of providing the separate analog transmitter includes:
 - splitting an output from an analog exciter to an RF circulator and to a phase compensation circuit; and
 - feeding the output of the phase compensation circuit to the separate analog
20 transmitter; and
 - combining the output of the RF circulator to an output from an IBOC exciter with a low level combiner; and
 - feeding the output of the low level combiner to the Linear Solid State IBOC
25 transmitter.
4. An efficient system for combining signals from a digital transmitter and an analog transmitter to produce a combined HD (High Definition) radio signal, comprising:
 - a Linear Solid State IBOC transmitter that outputs both digital and analog carriers;
 - a separate analog transmitter with an analog output; and

means for combining the digital and analog carriers output of the Linear Solid State IBOC transmitter through a combiner with the analog output of the separate analog transmitter.

5 5. The system of claim 4, wherein the combiner includes:
 a 3dB Hybrid combiner.

6. The system of claim 4, further comprising:
 a splitter for splitting an output from an analog exciter to an RF(radio frequency)
10 circulator and to a phase compensation circuit, and feeding the output of the phase
 compensation circuit to the separate analog transmitter; and
 a combiner for combining the output of the RF circulator to an output from an
 IBOC exciter with a low level combiner and feeding the output of the low level combiner
 to the Linear Solid State IBOC transmitter.

15

7. An method of combining signals from transmitters to produce a combined HD
(High Definition) radio signal, comprising the steps of:
 providing first transmitter with both digital and analog carriers output;
 providing a second transmitter with an analog output; and
20 combining the digital and analog carriers output of the first transmitter through a
 combiner with the analog output of second transmitter, to generate an HD radio signal.

8. The method of claim 7, wherein the combiner includes the step of: providing a
25 3dB Hybrid combiner.

25

9. The method of claim 7, wherein the step of providing the separate analog
 transmitter includes:
 splitting an output from an analog exciter to an RF(radio frequency) circulator and
 to a phase compensation circuit; and
30 feeding the output of the phase compensation circuit to the second transmitter; and

combining the output of the RF(radio frequency) circulator to an output from an exciter with a low level combiner; and
feeding the output of the low level combiner to the first transmitter.

- 5 10. A system for combining signals from a digital transmitter and an analog transmitter to produce a combined HD(High Definition) radio signal, comprising:
 a first transmitter that outputs both digital and analog carriers;
 a second transmitter with an analog output; and
 a combiner for combining the digital and analog carriers output of the first
10 transmitter with the output of the second transmitter to generate an HD output.
11. The system of claim 10, wherein the combiner includes:
 a 3dB Hybrid combiner.
- 15 12. The system of claim 10, further comprising:
 a splitter for splitting an output from an analog exciter to an RF (radio frequency) circulator and to a phase compensation circuit, and feeding the output of the phase compensation circuit to the second transmitter; and
 a combiner for combining the output of the RF (radio frequency) circulator to an
20 output from an exciter with a low level combiner and feeding the output of the low level combiner to the first transmitter.
13. A method of converting a radio station from analog transmission to digital transmission, comprising the steps of:
25 providing a first transmitter with both digital and analog carriers output;
 providing a second transmitter with an analog output; and
 combining the digital and analog carriers output of the initial transmitter through a combiner with the analog output of the second transmitter, to generate an HD radio
 signal.

30

14. The method of claim 13, wherein the combiner includes the step of: providing a 3dB Hybrid combiner.

15. The method of claim 14, wherein the step of providing the separate analog
5 transmitter includes:

splitting an output from an analog exciter to an RF (radio frequency) circulator
and to a phase compensation circuit; and

feeding the output of the phase compensation circuit to the second transmitter; and

combining the output of the RF (radio frequency) circulator to an output from an
10 exciter with a low level combiner; and

feeding the output of the low level combiner to the first transmitter.

16. A method of generating efficient high definition (HD) radio signals for radio
stations with transmission power output (TPO) between approximately 5,000 watts and
15 35,000 watts while energy costs are lowered, comprising the steps of:

providing a first transmitter with both digital and analog carriers output;

providing a second transmitter with an analog output; and

combining the first transmitter through a combiner with the second transmitter
without any reject loads from either the first transmitter or the second transmitter, to
20 generate an HD radio signal, wherein energy costs are lowered over existing methods of
generating HD radio signals.

17. The method of claim 16, wherein the combiner includes the step of: providing a
3dB Hybrid combiner.

25

18. The method of claim 16, wherein the step of providing the separate analog
transmitter includes:

splitting an output from an analog exciter to an RF (radio frequency) circulator
and to a phase compensation circuit; and

30 feeding the output of the phase compensation circuit to the second transmitter; and

combining the output of the RF (radio frequency) circulator to an output from an exciter with a low level combiner; and

feeding the output of the low level combiner to the first transmitter.

- 5 19. A method of generating efficient high definition (HD) radio signals for radio stations with transmission power output (TPO) between approximately 5,000 watts and 35,000 watts while increasing tube life, comprising the steps of:

providing a first transmitter with both digital and analog output;

providing a second transmitter with an analog output;

- 10 lowering power output of the second transmitter; and

combining the first transmitter with the second transmitter with a combiner to generate an HD radio signal, wherein the second transmitter has an increased tube life based on the lowering of the power output.

- 15 20. The method of claim 19, wherein the combiner includes the step of: providing a 3dB Hybrid combiner.

21. The method of claim 19, wherein the step of providing the separate analog transmitter includes:

- 20 splitting an output from an analog exciter to an RF (radio frequency) circulator and to a phase compensation circuit; and

feeding the output of the phase compensation circuit to the second transmitter; and

combining the output of the RF (radio frequency) circulator to an output from an exciter with a low level combiner; and

- 25 feeding the output of the low level combiner to the first transmitter.

22. A method of converting an analog radio station having an initial transmitter with analog output located within an existing building having existing HVAC(heating, ventilation and air conditioning) equipment into a digital radio station generating efficient
30 high definition (HD) radio signals with transmission power output (TPO) between

approximately 5,000 watts and 35,000 watts while saving on building space, comprising the steps of:

providing an additional transmitter with both digital and analog carriers output to the existing building; and

5 combining the analog output of the initial transmitter through a combiner with the analog and the digital carrier output of the second transmitter within the existing building, to generate an HD radio signal, without having to add additional HVAC equipment to the to existing HVAC equipment in the existing building.

10 23. The method of claim 22, wherein the combiner includes the step of: providing a 3dB Hybrid combiner.

24. The method of claim 22, wherein the step of providing the separate analog transmitter includes:

15 splitting an output from an analog exciter to an RF (radio frequency) circulator and to a phase compensation circuit; and

feeding the output of the phase compensation circuit to the second transmitter; and

combining the output of the RF (radio frequency) circulator to an output from an exciter with a low level combiner; and

20 feeding the output of the low level combiner to the first transmitter.

25. A method of using the existing space in a radio transmitter room to generate efficient high definition (HD) radio signals, comprising the steps of:

replacing an analog transmitter with a transmitter that produces both analog and

25 digital signals;

adding a digital equipment rack adjacent to the transmitter that produces both analog and digital signals;

adding an electrical disconnect wall unit; and

30 using the existing power supply and test/reject load, thereby creating additional space within the existing transmitter room.

26. A method of efficiently converting an analog radio station having an existing analog transmitter having an analog output to a HD(High Definition) digital radio station, comprising the steps of:

- 5 providing separate transmitter that generates both analog and digital outputs;
 combining the analog and the digital outputs of the separate transmitter with the
analog output of the existing analog transmitter; and
 generating a combined output that is equivalent to approximately 100% of both
wattage outputs of the existing analog transmitter and the separate transmitter, without
10 any reject loads, in order to generate efficient HD digital radio signals.

15

20